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RESERVE COPY PATENT SPECIFICATION

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COMPLETE SPECIFICATION

Improvements in or relating to Crutches

We, JAMES BOOTH & COMPANY LIMITED, a British Company, of Argyle Street Works, Neehells, Birmingham, in the County of Warwick, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 This invention relates to crutches for use by lame or infirm persons. At present it is the common practice in hospitals and other public institutions for such persons, to provide a large number of crutches of different size suitable for use by persons of different statures and different arm lengths, it being impossible for a crutch of one particular pattern to be used universally by people of different stature and different arm length. Such a practice often results in there being an insufficiency of crutches to meet the demand for a particular size in a given hospital or other institution, while there is a surplus of crutches of certain sizes, so that the existing practice is uneconomic and often inconvenient.

The primary object of the present invention is to provide a crutch of simple construction which can readily be adjusted to meet the size requirements of a large number of persons of different stature or arm length.

35 A further object of the invention is to provide a crutch which is well adapted to be manufactured in part in aluminium alloy or other light alloys.

The invention in its broadest aspect comprises a crutch embodying two elongated resilient supporting members, an arm-pit rest element connecting said members together in spaced relationship at their upper ends, a hand-grip element extending between said supporting members intermediate their ends and adjustable longitudinally thereof, a

ground-engaging element connecting together the lower ends of said two members in juxtaposed relationship and adapted to maintain said members in operative engagement with said hand-grip element to retain this in its adjusted position, said ground-engaging element being adjustable longitudinally in relation to said two supporting members, and means for locating said ground-engaging member against upward movement in relation to said two supporting members when in its adjusted position.

The invention is illustrated in the accompanying drawings, wherein:—

Figure 1 is a side elevation of one form of crutch embodying the present invention.

Figure 2 is a sectional view in side elevation to an enlarged scale of the upper part of the crutch depicted in Figure 1.

Figure 3 is a sectional view on the line 3—3 of Figure 2.

Figure 4 is a sectional view to an enlarged scale of a portion of the middle part of the crutch depicted in Figure 1 showing the mode of connection of the hand-grip element to one of the supporting members.

Figure 5 is a cross sectional view to an enlarged scale of the lower part of the crutch depicted in Figure 1.

Figure 6 is a sectional view on the line 6—6 of Figure 5.

Referring to the drawings, the crutch there illustrated comprises two supporting members 10 of elongated form and of substantially D-shape in cross section, each elongated member being formed in a resilient aluminium alloy for the purpose of reducing the weight of the crutch as far as possible.

The two D-sectioned members 10 are disposed with their flat side faces facing each other and have their upper

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ends connected rigidly together in spaced relationship by an arm-pit rest element 12 consisting of a wooden base 13 provided with holes in which the upper ends of the members 10 are secured, the base 13 being formed centrally with a cavity 14 which accommodates an inflatable rubber air cushion 15 secured peripherally to the base 13 by screws 16 and provided with an inflating valve 17 disposed between the supporting members 10.

The supporting members 10 have their upper parts 18 extending substantially parallel to one another as shown in Figure 1, and have their medial parts 19 converging downwardly towards one another with their lower extremities 20 substantially mutually parallel.

The medial parts 19 are each provided internally with a plug 21, and the opposed flat faces 11 of such parts adjacent such plug are formed with a number of longitudinally spaced holes 22, the inner ends of which are aligned with recesses 23 in the plug 21, and these holes and recesses are adapted to receive opposite ends of pins 24, a pair of which are provided spaced apart by a distance corresponding to the spacing between adjacent holes and recesses aforesaid, which pins 24 are mounted within a hand-grip element 25 of otherwise conventional form.

The arrangement is such that the hand-grip element can be adjusted longitudinally of the crutch to the extent permitted by the number of holes 22 and recesses 23 provided, adjustment being effected when the lower portions 20 of each member 10 are spaced apart from one another, while when the lower ends 20 of the supporting members are brought into juxtaposed relationship, the extremities of the pins 24 are disposed within the recesses 23, and the ends of the hand-grip element 25 are in rigid engagement with the adjusting sides 11 of the supporting members.

The lower end portions 20 of the supporting portions are normally retained in this relatively juxtaposed position in which they are substantially parallel with one another by means of a ground-engaging element 26 which is constructed separately from the supporting members 10.

This ground-engaging element comprises a sleeve 27 of internal diameter such that it can be slid over the juxtaposed end portions 20 of the supporting member, the sleeve being retained frictionally thereon by reason of the fact that the supporting members are so shaped that their lower ends tend to spring away from one another. Prefer-

ably the dimensions of the sleeve are such in relation to the dimensions of the two supporting members 10 that the opposed flat faces 11 of the two members are held by the sleeve in actual contact with one another, whereby relative longitudinal movement between the two members during operation of the crutch is effectively prevented.

The sleeve 27 is closed at its lower end by a cap 28 and has mounted thereon a rubber foot 29.

The sleeve can be adjusted longitudinally of the supporting members 10 by sliding it axially in relation to their lower ends 20, and the sleeve is held positively against upward movement in its adjusted position in relation to the supporting members by providing the sleeve internally with a plurality of ferrules 30 of different lengths, the ferrules being disposed in axially aligned abutting relationship, the lower end of the bottom ferrule engaging with the inner face of the cap 28, and the upper end of the upper ferrule engaging with the bottom end of the two supporting members 10. By removing one or more ferrules the operative position of the foot element 26 in relation to the supporting members 10 can be varied in accordance with the requirements of the user in addition to the adjustment provided between the hand-grip and the supporting members.

The present invention provides, therefore, a crutch, the overall length of which can readily be adjusted to suit the requirements of a particular user in which, however, the position of the hand-grip can be adjusted longitudinally of the crutch, so that a crutch as described can be made in a standard pattern for supply to hospitals and other institutions and adjusted by the institutions themselves to meet the requirements of particular users.

What we claim is:

1. A crutch comprising two elongated resilient supporting members, an arm-pit rest element connecting said members together in spaced relationship at their upper ends, a hand-grip element extending between said supporting members intermediate their ends and adjustable longitudinally thereof, a ground-engaging element connecting together the lower end of said two supporting members in juxtaposed relationship and adapted to maintain said members in operative engagement with said hand-grip element to retain this in its adjusted position, said ground-engaging element being adjustable longitudinally in relation to said two supporting members, and means for locating said ground-engaging

element against upward movement in relation to said two supporting members when in its adjusted position.

2. A crutch according to Claim 1, wherein the ground-engaging element is adjustable slidably in relation to the lower ends of the two supporting members, the latter engaging said ground-engaging element resiliently so as frictionally to restrain it against longitudinal movement.

3. A crutch according to Claim 1 or 2, wherein the ground-engaging element comprises a sleeve embracing slidably the lower ends of said two supporting members.

4. A crutch according to Claim 3, wherein the sleeve is provided internally at its lower end with an abutment adapted positively to engage the juxtaposed lower ends of the two supporting members, one or more distance pieces being provided adapted to be mounted removably within said sleeve between said abutment and said juxtaposed supporting member ends in engagement therewith, the arrangement being such that the ground-engaging element can be located positively against upward movement in relation to said crutch-supporting members in a plurality of longitudinally adjusted positions in relation to said members according to whether all of the distance pieces, or only some or none of them, are disposed within said sleeve.

5. A crutch according to Claim 4, wherein each supporting member is formed as a resilient metal tube of substantially D-form in cross section with the flat sides of each D-section tube disposed in opposed relationship.

6. A crutch according to any of Claims

3 to 5, wherein the sleeve is adapted to maintain the juxtaposed lower ends of the supporting members in direct contact with one another, for the purpose specified.

7. A crutch according to any of the preceding Claims, wherein each of the two supporting members is formed in a light alloy, for example, an aluminium alloy.

8. A crutch according to any of the preceding Claims, wherein the hand-grip element is provided at each end thereof with a pair of vertically spaced projections, the two supporting members being provided on each of their opposed faces intermediate their ends with a plurality of vertically spaced openings spaced apart from one another by a distance corresponding to the spacing of said two hand-grip element projections; said openings being adapted releasably to receive said projections so as to locate said hand-grip element against longitudinal movement in relation to the crutch.

9. A crutch according to any of the preceding Claims, wherein the arm-pit rest element comprises a rigid base connected rigidly to the upper ends of said two supporting members, said base carrying on its upper side an inflatable air cushion.

10. A crutch substantially as hereinbefore described with reference to, and as shown in the accompanying drawings.

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PROVISIONAL SPECIFICATION

Improvements in or relating to Crutches

We, JAMES BOOTH & COMPANY LIMITED, a British Company, of Argyle Street Works, Nechells, Birmingham, in the County of Warwick, do hereby declare this invention to be described in the following statement:—

This invention relates to crutches for use by lame or infirm persons and is primarily concerned with the provision of a generally improved article of this nature which is easy to manipulate and which can readily be adjusted to conform with the height and arm-length of the user.

According to the present invention, there is provided a crutch wherein two elongated resilient supporting members

are held spaced apart towards one pair of adjacent ends by means of a transverse arm-pit rest arranged across the members at or near said ends and by a hand-grip arranged across the members intermediate their lengths, and wherein the opposite pair of adjacent ends of said members are sprung together, or towards each other, and entered through one end of a sleeve or tube member in which they are retained, means being provided for adjusting the depth of insertion of said sprung-together ends in the sleeve or tube member in accordance with the desired overall length of the crutch. The main parts of the crutch are preferably made of a light tubular metal such as duralumin

and all parts of the crutch are readily exchangeable in the event of damage or breakage.

In order that the invention may be clearly understood, one embodiment thereof will now be indicated in greater detail.

In this embodiment, the crutch has two main elongated supporting members of substantially equal length and composed of light tubular metal of semi-circular cross-section, the members each being slightly resilient. One pair of adjacent ends of said members are attached, in a spaced apart position and with the flat faces of the members directed towards each other, to a transverse member the upper or outer face of which is shaped to fit under an arm-pit and to provide an arm-pit rest. To this end the said face is dished in the longitudinal direction. A strap may, if desired, be stretched from one end of the transverse member to the other so as to span the dished portion and provide a yielding support for the arm-pit.

A plug is arranged within each of the main tubular members intermediate the length thereof and a longitudinally extending row of apertures is provided through each of the flat facing surfaces of the tubular members and part-way through the said plugs. Corresponding apertures in each row are located opposite to one another so that opposite ends of a transverse tubular member can be inserted in any facing pair of apertures. This transverse tubular member forms the core for a hand-grip, the outer shell of which may be made of wood or any other suitable material.

The ends of the main supporting members remote from the arm-pit rest are sprung or bowed together and inserted into a tubular member or sleeve through one end thereof. The outer or free end of this sleeve is closed by means of an end cap and this end may also carry, over the cap, a rubber ferrule or like member which serves to prevent the crutch slipping on the ground and also to provide a certain cushioning action when the end of the crutch contacts the ground. Within the sleeve, between the aforesaid cap and the inserted ends of the elongated members, may be arranged one or more tubular inserts which serve to limit or regulate the depth of entry of the aforesaid sprung-together ends into the sleeve. As will be appreciated, the natural resilience of the elongated tubular members ensures that the sleeve remains gripped tightly over the sprung-together ends when the latter have been inserted therein.

In order to adjust the overall length of the crutch according to the height of the user, the sprung-together ends of the elongated tubular members are withdrawn from the sleeve and further inserts are added, or alternatively inserts are removed, for the purpose of decreasing or increasing the depth to which the sprung-together ends can enter the sleeve. There is thus provided an extremely simple and rapid method for adjusting the overall length of the crutch. If desired, the possible amount of overall length adjustment may be further increased by arranging the arm-pit rest for adjustment in relation to the elongated members.

To provide adjustment according to the length of arm of the user, the hand-grip may be inserted in any of the pairs of holes as described according to the desired distance of this hand-grip from the arm-pit rest. This adjustment of the hand-grip can readily be effected when the sprung-together ends of the elongated tubular members are withdrawn from the sleeve, since the said elongated members can then easily be sprung apart by an amount sufficient to enable the handle ends to be removed from one pair of holes and inserted in another pair.

As will be appreciated, the parts of the crutch can all be made of standard design so that replacement of any part which becomes accidentally damaged or broken can be quickly and easily effected.

In a modified form, the hand-grip of wood, composition or other suitable material may be arranged around two parallel rods positioned one above the other with their ends projecting from each end of the said grip. Each pair of rod ends can then be engaged in a pair of adjacent apertures in a row of apertures formed through the flat surface and part-way through the plug insert of the adjacent main member. This modified arrangement has the advantage that the hand-grip cannot turn about its longitudinal axis whilst in use and, furthermore, permits a fine adjustment of the distance of the hand-grip from the arm-pit rest.

It has previously been stated that the main members are of semi-circular cross-section but it will be appreciated that they could also be of D or other suitable cross-section. The inserted plugs are solid and have a cross-section which corresponds in shape to the cross-section of the side members, the apertures for the hand-grip rods being, as aforesaid, drilled only through the inner surfaces of the main members and part-way through these plugs. This ensures that the full strength of the main members is retained under

stress.

If desired, the arm-pit rest may have an air cushion of moulded rubber or the like attached thereto to provide additional comfort. The cushion would be provided with a suitable valve, such as a normal type tyre valve, whereby the cushion can be inflated to the required pressure.

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